



**PHOTOFACT<sup>®</sup> with**

**CIRCUITRACE<sup>®</sup>**

For Supplier Address See PHOTOFACT Index

#### NOTE

Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license.  
(Refer to FCC Rules and Regulations Part 95, Subpart C & D.)

The frequency of the transmitter should be checked periodically with a secondary frequency standard to insure proper and legal operation.

Best results will be obtained when adjusting the final RF output circuit if the antenna normally used is connected and the chassis is as nearly in the cabinet as possible.

Connect either 50-ohm dummy load or the normally used antenna system.



MODEL TRC-449 (21-1562)

#### MANUFACTURER'S SPECIFICATIONS

##### GENERAL :

Channels	: 40 Channels for AM, Upper Side Band and Lower Side Band, utilizing Digital Circuitry
Frequency Range	: 26.965 MHz to 27.405 MHz
Frequency Control	: Digital (Phase Lock Loop) Synthesizer
Frequency Accuracy	: $\pm 100$ Hz
Operating Temperature Range	: $-20^{\circ}\text{C}$ to $+50^{\circ}\text{C}$
Power Requirements	: 13.8V DC (12-16 volts DC, negative or positive ground)
Antenna	: 52 ohm (Coaxial connector)
Microphone	: 600 ohm Dynamic Type
Speaker	: 8 ohm, 3 Watt
Size	: 2-3/8" x 7-7/8" x 10-1/2" (HWD) (6 x 20 x 26.6 cm [HWD])
Weight	: 6 lbs. (approx.) (2.65 kg)
Accessories	: DC Cord with in-line Fuse, Microphone and Microphone Hanger and Mounting Brackets

##### MEASUREMENT CONDITION:

Power Source	: 13.8V DC
Antenna Impedance	: 50 ohm
Test Temperature	: $25^{\circ}\text{C}$
AM Modulation Frequency	: 1 kHz
SSB Modulation Frequency, Transmit	: Two tone: 500 Hz and 2400 Hz Single tone: 1 kHz
Mean Signal Input Level	: $1000\ \mu\text{V}$
Reference Audio Output Power	: 0.5 W
Reference AM Modulation Percentage	: 1 kHz 30%
Audio Frequency, SSB Receive	: 1 kHz
Audio Output Load	: 8 ohms resistive
Measuring Channel	: 19

Courtesy of the Manufacturer

**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46206

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REALISTIC MODEL TRC-449

ALIGNMENT INSTRUCTIONS

CAUTION: Use isolation transformer or observe polarity when connecting test equipment. Maintain line voltage at 120V AC. Allow a 15-minute warm-up period. Adjustments made with 13.8 volt at TP10 (TR401 Emitter). Connect low sides of test equipment to ground unless specified otherwise. Connect 50-ohm dummy load or antenna before keying transmitter. Suggested Alignment Tools: GC Electronics: CT1 thru CT7.....8276,5000 L27,L30,L32.....9091,8728A,8728 L1 thru L5,L7,L8,L16,L17,L24,L37,L39.....9440

SYNTHESIZER ALIGNMENT

TEST EQUIPMENT	TRANSCIVER	ADJUST	REMARKS
Input of frequency counter thru 47pF to TP11 (IC7, pin 10).	Ch. 1, AM		Check for 10.240MHz.
Input of oscilloscope to TP6.	Ch. 1, AM	L24	Adjust for maximum RF.
Input of frequency counter to TP6.	Ch. 1, AM Clarifier Midrange	CT6	Adjust for 33.855MHz +20Hz.
	Ch. 1, USB Clarifier Midrange	CT4	Adjust for 33.8574MHz +20Hz.
	Ch. 1, LSB Clarifier Midrange	CT5	Adjust for 33.8526MHz +20Hz.
Input of DC meter to TP7.	Ch. 1, AM Clarifier Midrange	L17	Adjust for 2.00 volts.
Input of oscilloscope to TP8.	Ch. 19, AM Clarifier Midrange	L16	Adjust for maximum RF.
Input of frequency counter to TP8.	Ch. 1, AM Clarifier Midrange		Check for 34.765MHz. Check all channels. (See Truth Chart for correct frequencies).
	Ch. 1, USB Clarifier Midrange		Check for 34.7675MHz. Check all channels. (See Truth Chart for correct frequencies).
	Ch. 1, LSB Clarifier Midrange		Check for 34.7625MHz. Check all frequencies. (See Truth Chart for correct frequencies).
Input of frequency counter to TP12 (TR31 collector).	Ch. 1, AM Clarifier Midrange		Check for .910MHz. Check all channels. (See Truth Chart for correct frequencies).
Input of frequency counter to TP9	Ch. 1, USB	CT2	Adjust for 7.8025MHz +5Hz.
	Ch. 1, LSB	CT3	Adjust for 7.7975MHz +5Hz.
Input of frequency counter to antenna jack.	Ch. 1, AM, XMT	VR9	Adjust for 26.965MHz.

RECEIVER ALIGNMENT

Connect an AC VTVM or AF wattmeter across speaker voice coil. Adjust volume control to obtain a suitable indication. Set generator output low enough to prevent AGC limiting. RF Gain Maximum, Clarifier 0, Squelch MINIMUM, NB Switch Off, ANL Switch Off.

AM

TEST EQUIPMENT	TRANSCIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to TP13 (FET1, G1). 7.8MHz,1000Hz @ 30% modulation.	Ch. 19, AM	L8,L7,L5	Adjust for maximum output.
Output of signal generator thru .01uF to antenna jack. 27.185MHz,1000Hz @ 30% modulation.	Ch. 19, AM	L4,L3	Adjust for maximum output. If necessary readjust L5, L6,L7, and L8.
Inject a 100pps, 1u sec signal at MIC input. Input of oscilloscope to TP5.	Ch. 19, AM	L1,L2	Adjust for maximum.

RECEIVER ALIGNMENT

Connect an AC VTVM or AF wattmeter across speaker voice coil. Adjust volume control to obtain a suitable indication. RF Gain Maximum, Clarifier 0, Squelch MINIMUM, ANL Switch Off, NB Switch Off, Volume Maximum.

SSB

TEST EQUIPMENT	TRANSCIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to antenna jack. 27.186MHz, no modulation. Output .25uV.	Ch. 19, USB	CT1	Adjust for 2 volts audio.

RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF wattmeter across speaker voice coil. Adjust volume control to obtain a suitable indication. RF Gain Maximum, Clarifier 0, Squelch MINIMUM, NB Switch Off, ANL Switch Off.

TEST EQUIPMENT	TRANSCIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to antenna jack. 27.185MHz,1000Hz @ 30% modulation. Output .5uV.	Ch. 19, AM Volume Maximum	VR5	AM RX GAIN Adjust for 2 volts audio.
Output of signal generator thru .01uF to antenna jack. 27.185MHz,1000Hz @ 30% modulation. Output 50uV.	Ch. 19, AM RF Gain MINIMUM Squelch Maximum	VR2	RF GAIN Adjust for 2 volts audio.
Output of signal generator thru .01uF to antenna jack. 27.185MHz,1000Hz @ 30% modulation. Output 1000uV.	Ch. 19, AM Squelch Maximum	VR3	SQUELCH RANGE Adjust so that squelch just breaks.
Output of signal generator thru .01uF to antenna jack. 27.185MHz,1000Hz @ 30% modulation. Output 100uV.	Ch. 19, AM	VR1	SIGNAL METER Adjust for 9 on SIGNAL scale of meter.



## TRANSMITTER ALIGNMENT

Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.  
NOTE: Be sure to check transmit frequency and power on all active channels after alignment of transmitter.

### AM

TEST EQUIPMENT	TRANSCIEVER	ADJUST	REMARKS
Input of Spectrum analyzer or harmonic meter to antenna jack.	Ch. 19, AM	L27	Adjust for MINIMUM at 54MHz.

## TRANSMITTER ALIGNMENT

Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.  
NOTE: Be sure to check transmit frequency and power on all active channels after alignment of transmitter.  
See page 4 for channel frequencies.

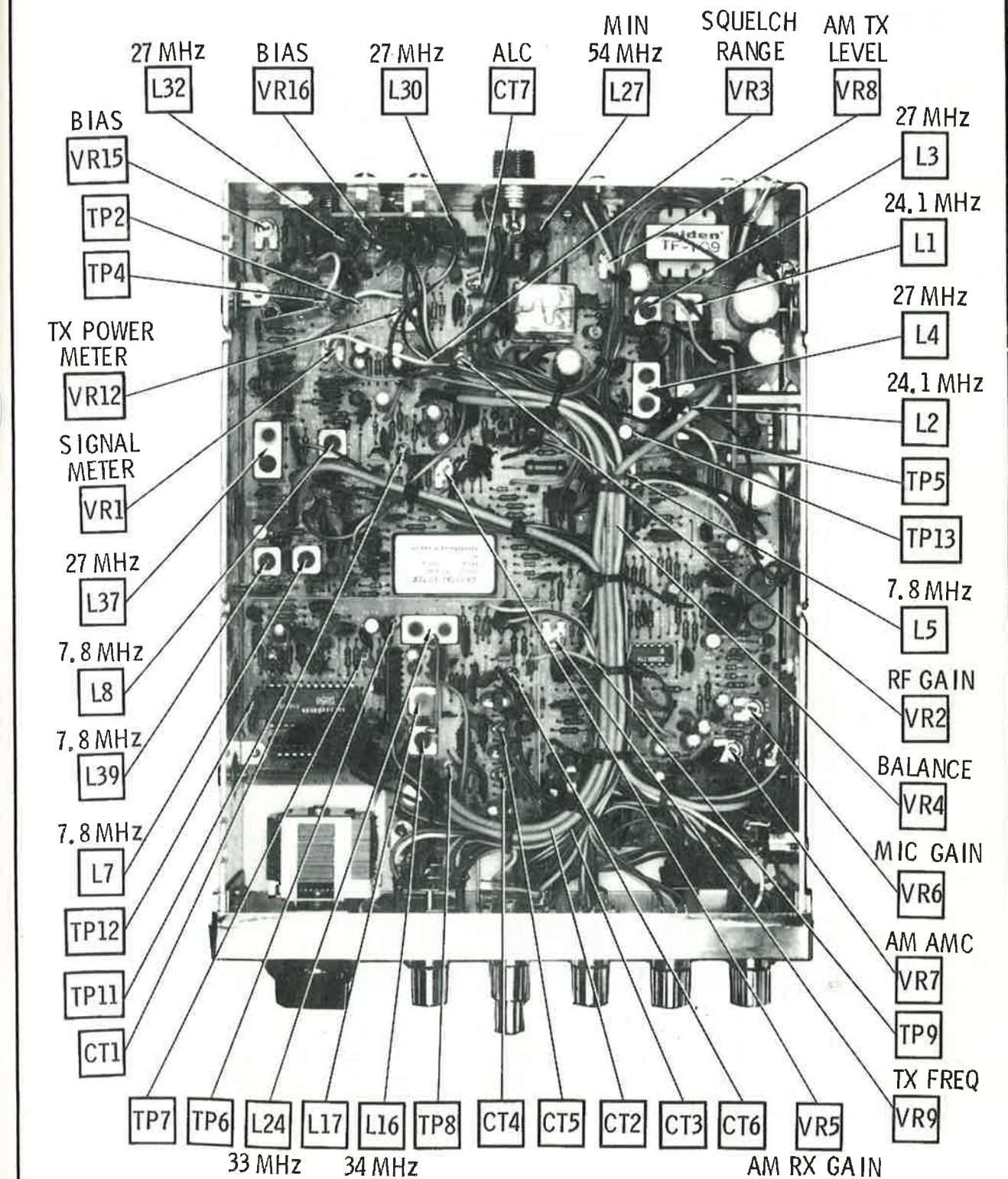
### SSB

TEST EQUIPMENT	TRANSCIEVER	ADJUST	REMARKS
Inject a 1000Hz 5mV signal at MIC input.	Ch. 19	L39,L37, L32,L30, CT7	Adjust for maximum.
Inject a 1000Hz 200mV signal at MIC input.	Ch. 19	CT7	Adjust for 12 watts.

## TRANSMITTER ADJUSTMENTS

Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.  
NOTE: Be sure to check transmit frequency and power on all active channels after adjustment of transmitter.  
See page 4 for channel frequencies.

TEST EQUIPMENT	TRANSCIEVER	ADJUST	REMARKS
Connect current meter in series with circuit at TP4. No signal input.	Ch. 19, USB	VR15	BIAS Adjust for 40mA.
Connect current meter in series with circuit at TP2. No signal input.	Ch. 19, USB	VR16	BIAS Adjust for 15mA.
Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector. No signal input.	Ch. 19, USB	VR4	BALANCE Adjust VR4 for MINIMUM RF.
	Ch. 19, AM	VR8	AM POWER Adjust for 4 watts maximum.
Inject a 1000Hz, 5mV signal at MIC input. Input of oscilloscope or modulation meter to antenna jack.	Ch. 19, AM	VR6,VR7	MIC GAIN & AM AMC Turn VR7 (from top) fully clockwise. Adjust VR6 for 50% modulation. Increase audio to 200mV. Adjust VR7 for 100% modulation maximum.
Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.	Ch. 19, AM	VR12	TX POWER METER Adjust so that the Power meter reads just below the red on the power scale of meter.



CHASSIS - BOTTOM



